

**EXHIBIT G  
PART 1 OF 6**

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INTELLECTUAL CAPITAL EQUITY



**OCEAN TOMO**

INTELLECTUAL CAPITAL EQUITY

**ORACLE AMERICA, INC.**

**v.**

**GOOGLE INC.**

**CASE NO. CV 10-03561 WHA**

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**RESPONSIVE EXPERT REPORT OF JAMES E. MALACKOWSKI**

**[CORRECTED]**

**February 29, 2016**



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## 1. FIRM BACKGROUND AND QUALIFICATIONS

1. My background and qualifications are set forth in my prior report dated January 8, 2016.

## 2. ASSIGNMENT

2. Ocean Tomo was retained by Orrick, Herrington & Sutcliffe LLP (“Orrick”) counsel for plaintiff, Oracle America, Inc. (“Oracle” or “Plaintiff”), in connection with this matter in July of 2015. Ocean Tomo has been asked to evaluate the amount of monetary recovery due to Oracle for Google Inc.’s (“Google” or “Defendant”) infringement of copyrights in the Java platform (“Infringed Java Copyrights”) in connection with Google’s Android platform for use in mobile phones and other devices.
3. In connection with my assignment in this matter, I issued an expert report on January 8, 2016 which provided my opinions regarding the amount and type of losses suffered by Oracle, as well as the non-apportioned revenues and profits generated by Google that, in my opinion, meet the causal nexus test (“Initial Report”).
4. As explicitly stated in my Initial Report, as of the date of that report, I had not addressed the issue of apportioning Google’s profits which meet the causal nexus test between infringing and non-infringing attributes of the Android Platform, referred to generally as Google’s causally connected profits. Rather, I expected to offer such opinions in a later report, as set out by the three-part damages report schedule in this case.
5. This is that “later report” and therefore it reflects my opinions regarding the apportionment of Google’s causally connected profits. In addition to addressing the apportionment of Google’s causally connected profits, this report also provides responses to several opinions put forth in the report submitted by Google’s damages expert (Dr. Gregory Leonard) on February 8, 2016 (“Leonard Report”).
6. A detailed listing of the documents reviewed by Ocean Tomo since the issuance of my Initial Report is included in the footnotes to this report and/or the summary provided in **Exhibit 2**. References to documents and testimony herein are meant to provide examples of supporting information, but are not intended to be a comprehensive or exhaustive listing of all known support or to signify a heightened level of importance. In addition to this report, I may rely on video excerpts taken from videotaped depositions and/or demonstrative exhibits that illustrate the concepts and conclusions contained in this report. Such excerpts and/or demonstratives have not yet been prepared.
7. The opinions discussed throughout this report are based on my current understanding of the facts and circumstances surrounding this matter, my review of the produced documentation, testimony, third party and public information available to date, the legal framework for copyright remedies, and any underlying assumptions upon which I have relied. As such, the analyses and opinions described herein are subject to change based upon additional discovery or any other relevant development.



8. In connection with my work in this matter, I have assumed the Infringed Java Copyrights are copyrightable and have been infringed. That assumption is made exclusively for the purpose of determining the appropriate measure and amounts of monetary recovery, and in no way represents any form of legal conclusion.

### 3. SUMMARY OF OPINIONS

9. As stated in my Initial Report, I understand Oracle is entitled to the amount of actual damages it has suffered as a result of Google's infringement, as well as any profits earned by Google which are attributable to its infringement, but not already taken into account in computing Oracle's actual damages.<sup>1</sup>
10. As also stated in my Initial Report, at a minimum, Google's infringement of the Java Copyrights resulted in Oracle losing licensing revenues from third-party license agreements and also prevented Oracle (or its licensee) from launching a new mobile platform. In my Initial Report, I determined that Oracle's lost profits from lost Java ME license agreements with third parties totaled \$475 million. I also concluded that, while I was unable to quantify with reasonable certainty Oracle's lost profits resulting from it having been prevented from launching a new mobile operating system, nor any other component of potential loss, I was confident that such losses had in fact occurred. While the Leonard Report rebuts my opinions related to Oracle's losses, as discussed later in Section 5, my opinions in that regard remain unchanged.
11. My Initial Report also quantifies the amount of total profit Google realized as a result of the infringement of the Java Copyrights by the Android platform. In that report I noted Google has generated Android-related revenue and profit which is attributable to the Infringed Java Copyrights, including: advertising revenues associated with Android devices; sales of Applications and Digital Content through Android Market/Google Play; and sales of Google's Nexus devices. Although Oracle was only required to present proof of the infringer's gross revenues at the time of my Initial Report, I nonetheless included in my analysis all of the costs and expenses which I believe should be deducted from those gross revenues. While the Leonard Report responds to my opinions regarding the causal nexus between certain of Google's revenues and the Infringed Java Copyrights, and the amount and type of costs I have subtracted from those revenues, with the few revisions reflected herein, my opinions in that regard remain unchanged, as discussed later in Section 4 of this report.
12. Since it is Defendant's burden to establish an apportionment of profits between infringing and noninfringing attributes, my Initial Report did not offer any opinions regarding the portion of Google's profits which related to infringing attributes of the Android Platform. Rather, I deferred the proffer of any such opinions to the issuance of this report.
13. In connection with preparing my opinions on the issue of apportionment, I have considered the opinions put forth in the Leonard Report. I conclude that Dr. Leonard's "bottom-up"

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<sup>1</sup> 17 U.S.C. §504 – Remedies for Infringement: Damages and Profits.



apportionment approach is fundamentally flawed in that it reflects an attempt to quantify Google's "unjust enrichment," as opposed to more properly measuring the portion of the profits actually generated by Google which can reasonably be attributed to the infringing attributes of the Android platform versus the noninfringing attributes.

14. I further find Dr. Leonard's reliance on a "counterfactual" world to evaluate disgorgement undermines any reliability of his opinions, since the Court has previously ruled in this matter that such an approach is inappropriate when evaluating disgorgement of profits, and also given the purpose of the disgorgement of profits remedy as I understand it. My opinions in that regard are detailed in Section 4.
15. I also find Dr. Leonard's calculation of expense deductions to be unreliable in that it improperly allocates certain costs to the Android business, while overstating others. Notably, Dr. Leonard has included certain costs in his profit calculation that his former colleague and Google's prior damages expert (Dr. Cox) did not. I also believe that Dr. Leonard's approach to allocating G&A costs based on engineering headcount is cursory and unsupported. The Court's prior orders also require a causal nexus between revenues and expenses in order to support such deductions; I find no basis in what Dr. Leonard has set forth to establish such a nexus. My opinions in that regard are detailed in Section 4.5.
16. With specific regard to the "top-down" and "bottom-up" apportionment methodologies put forth in the Leonard Report, I believe neither reflects a reasonable basis by which Google's causally connected profits can be apportioned. With specific regard to the "top-down" approach, Dr. Leonard's "lines of code analysis" is factually unfounded based on analysis of the code performed by Oracle's technical experts and more importantly, runs contrary to my understanding of how to apply the relevant case law in that it is a mechanical approach that fails to properly account for the relative contribution of the Infringed Java Copyrights to the success of the platform under the actual business circumstances faced by Google. With regard to Dr. Leonard's cost-based "bottom-up" approach, he fails to recognize the difference between cost and value, fails to recognize the importance of Google's timely market entry and fails to recognize that this Court has already rejected a cost-based analysis for the purpose of apportioning Google's causally connected profits. Cost avoidance is a theory of unjust enrichment rather than disgorgement of profits. My opinions in that regard are detailed in Sections 4.6 and 4.7.
17. Given Google's failure to put forth a reasonable apportionment methodology, I have performed my own apportionment analysis which measures the Platform Contribution provided for by the Infringed Java Copyrights. My determination of the Platform Contribution is based on a weighted average analysis of what Google pays to others for the contribution of their non-Android mobile platforms in connection with generating search advertising revenue. I find that arms' length market-based negotiations provide objective evidence that mobile platforms contribute approximately 36 percent of value to mobile advertising.
18. My opinion is consistent with the legal theory of commingling in that it reflects 100 percent of the value of the Platform Contribution. Commingling occurs when the infringer has mixed the infringing and noninfringing attributes in a way that makes it difficult or impossible to separate out



the respective contributions of each to overall profits attributable to the accused work. I find application of that legal theory would be appropriate in this case because Google knowingly assumed the risk of its failure to obtain a license and created the scenario whereby the relative contributions of the 37 Java APIs (“Java APIs”)<sup>2</sup> to the total Platform Contribution are difficult to discern. My opinion is also consistent with the overall business circumstances. As previously described, Google faced an extremely competitive landscape with a very limited window of opportunity, and had to obtain the cooperation of numerous other business actors in order to make a successful launch of the Android Platform. Those business actors were familiar with (and comfortable with) Java in mobile phones. Java represented a significant portion of the market at the time, and Google overtly capitalized upon that familiarity and comfort with the very important audience of carriers and OEMs. Furthermore, the technical expert evidence also shows that Android and its most important applications are dependent upon the Java APIs, that the Java APIs provided stability to the Android Platform during the critical launch period, and that the Java APIs are centrally important to the Android Platform. Under these circumstances, use of the commingling legal theory is appropriate because the Java APIs are properly viewed as a “gating item” to the Android Platform. Examples of certain presentations I have reviewed are provided below and a summary of all the presentations I have reviewed to date can be found in the Exhibits attached to my report.

- In a 2006 pitch to T-Mobile, Google states “Supporting Java is the best way to harness developers: The wireless industry has adopted Java, and the carriers require its support” and plans to “leverage Java for its existing base of developers.”<sup>3</sup> Additional slides include reference to Android Runtime including Core Java libraries and Java Virtual Machine; application level Java interface to telephony sub-system, standard Java class libraries, Java developer tools, Java application framework, and a constrained time frame.<sup>4</sup>
- In 2006, a presentation made to LG included references to a “powerful, simple Java Application Framework”<sup>5</sup> and “Standard Java Class libraries; MIDP 2.0 support.”<sup>6</sup> Also a presentation made to BenQ listed references to specific JSRs, J2ME and CDC 1.1.<sup>7</sup>

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<sup>2</sup> I understand ‘37 Java APIs’ to refer to the declaring code and the structure, sequence and organization of the 37 Java APIs packages at issue.

<sup>3</sup> GOOGLE-24-00147891, slide 39.

<sup>4</sup> GOOGLE-24-00147891, slides 40, 56, 59, 60, 71, 73 and 77.

<sup>5</sup> GOOGLE-24-00152227, p. 3.

<sup>6</sup> GOOGLE-24-00152227, p. 25.

<sup>7</sup> GOOGLE-24-00013099, p. 7.



- Android overviews touting a “powerful simple Application Framework”<sup>8</sup> and a Telephony middle layer with Java at the phone application layer<sup>9</sup> were presented to LG<sup>10</sup>, Asian OEMs<sup>11</sup> and Qualcomm.<sup>12</sup>

19. Based on the outcome of that analysis, it is my opinion that the amount of Google’s profits which meet the causal nexus test and are related to infringing attributes of the Android Platform is \$8.8 billion. My apportionment methodology and related opinions are detailed in Section 7 of this report.

20. A summary of my current opinions regarding Oracle’s actual damages and the portion of Google’s causally connected profits which relate to the Infringed Java Copyrights is provided in the following Figure.

**Figure 1**  
**Summary of Opinions**

<b>Measure of Monetary Recovery</b>	<b>Amount (in Billions)</b>
Oracle’s Actual Damages	\$0.475
Profits Apportioned to Infringed Java Copyrights	\$8.829

21. The specific bases for my opinions are provided throughout the remainder of this report and my Initial Report as well. In summary however, my opinions are supported by each of the following facts:

- The Infringed Java Copyrights were critically important to the timing of Google’s launch of the Android platform, especially considering the business circumstances at the time and the nature of platform economics outlined by Dr. Jaffe in his report.
- Google’s strategy in launching Android as a mobile platform was to ensure a continuing revenue stream from its search services in connection with mobile advertising. Mobile search has generated significant advertising revenue and profit for Google, and the Android platform is a critical component of Google’s overall mobile search business.
- The Infringed Java Copyrights are necessary for and critically important to the ongoing operation of the Android Platform and its applications.

<sup>8</sup> GOOGLE-03-00146539, p. 3.

<sup>9</sup> GOOGLE-03-00146539, p. 19.

<sup>10</sup> GOOGLE-01-00066237 and GOOGLE-01-00066262.

<sup>11</sup> GOOGLE-03-00139402.

<sup>12</sup> GOOGLE-03-00146539, GOOGLE-03-00147537.



- Absent Google's use of the Infringed Java Copyrights, Sun would have generated significantly more licensing revenue at least from its Java ME platform.
- Absent Google's use of the Infringed Java Copyrights, Sun was strategically positioned to introduce a successful mobile platform, either itself or through a licensee.

22. As seen in the sections that follow, this report first provides a response to certain opinions put forth in the Leonard Report. That response begins with a discussion of certain methodological errors reflected in the Leonard Report before moving on to discuss certain inadequacies in Dr. Leonard's opinions relating to the identification, quantification and apportionment of Google's causally connected profits. Next, I respond to Dr. Leonard's opinions regarding Oracle's lost profits, as well as several technical issues upon which Dr. Leonard has opined. Finally, I consider my initial opinions in light of Dr. Leonard's views, and put forth my responsive opinions regarding the portion of Google's causally connected profits which relate to the infringing attributes of the Android platform.

#### 4. RESPONSE TO DR. LEONARD'S UNJUST ENRICHMENT OPINIONS

##### 4.1 Dr. Leonard's Summary of My Causal Nexus Analysis is Incorrect

23. Dr. Leonard states:

*Mr. Malackowski's causal nexus argument can be summarized as follows: if the allegedly infringing material were removed from Android (and Google was not allowed within the counterfactual to adjust Android in any way,) Android would not work, and Google would not earn any of the associated revenues and profits.<sup>13</sup>*

This is a gross oversimplification of the opinions put forth in my Initial Report, particularly with regard to Section 11.1 in which I describe (in detail) how the Infringed Java Copyrights are causally connected to the Android profits.

24. Dr. Leonard ignores both the technical evidence and the business evidence. I relied not just upon the notion that Android would not work without the Java APIs, although that certainly is true based upon the findings of the technical experts - including Google's own technical expert Dr. Astrachan.<sup>14</sup> Beyond that causal relationship, there is also the technical work done to show that the Java APIs are central to the Android Platform and important applications, including Google's applications, and that they lent a great deal of stability to the platform during its critical launch window.<sup>15</sup>

25. Dr. Leonard also ignores the fact that the carriers were familiar with, and already dependent upon, Java-based systems, and considered Java the dominant mobile platform at the time Google was

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<sup>13</sup> Expert Report of Dr. Leonard, February 8, 2016, p. 15.

<sup>14</sup> Rebuttal Expert Report of Dr. Astrachan, February 8, 2016, ¶¶ 61, 63 and 82.

<sup>15</sup> Expert Report of Dr. Kemerer, February 8, 2016, ¶ 78.



seeking to break into the market. Without the carriers, Google would not have been able to launch a new platform. Google recognized this problem and spent many months making presentations to carriers and OEMs in which it touted the fact that Android would be Java-based. Google used this existing familiarity with Java to develop support during the critical development window in 2006 and 2007 while it put together the Open Handset Alliance. A summary of the presentations I have reviewed to date can be found in the Exhibits attached to my report.

26. In addition, the platform economics as described by Dr. Jaffe further underscores the great significance of the business circumstances faced by Google in 2006 when it made the “final” decision to build a Java-based system, as set out in my Initial Report. As explained by Dr. Jaffe, multi-sided platform markets like this one are very limited in their opportunities for success and depend upon critical gating actors who are beyond the control of the platform provider. In this matter, those gating actors were the OEMs and carriers.
27. This is exactly what Google contemplated when it created the Android Platform. Because Android was Java-based, it would be credible with OEMs and be adopted quickly. OEM adoption would create a multi-sided platform that Google controlled, permitting Google to derive revenue from mobile advertising and Google searches initiated from Android devices. As described in its strategy documents, Google considers advertising revenue to be part of the “Direct Revenue Impact” of the platform.

**Figure 2**  
**Google Strategy Document**





28. This is further confirmed by statements made by Eric Schmidt in earnings calls who stated that Android was “hugely profitable,”<sup>16</sup> and in interviews given by Andy Rubin who agreed that, because of Google’s advertising model, Android is profitable by itself even though Google does not charge for the Android product.<sup>17</sup>
29. Further, Dr. Leonard’s alleged counterfactual causal nexus approach suffers from numerous flaws, as discussed further below.

#### **4.2 Dr. Leonard’s Counterfactual Approach to Causation is Improper**

30. Dr. Leonard’s approach to determining the causal connection between the infringement and Google’s revenues and profits is unreliable. Dr. Leonard relies on an incomplete and unrealistic construction of a “counterfactual” world.<sup>18</sup> Dr. Leonard’s “counterfactual” approach to determining causation is explained in his report as follows:

*Speaking as an economist, the appropriate conceptual way to measure the causal effect of a factor on an outcome variable is to compare the difference in the outcome variable between the actual world and the counterfactual where the factor in question is altered exogenously from its actual value and the rest of the system is allowed to adjust.<sup>19</sup> In the case of an economic system, this means that the economic actors are allowed to reoptimize and choose new actions in the counterfactual.<sup>19</sup>*

31. I understand Dr. Leonard’s counterfactual approach to evaluating causation to be a “but-for” analysis which assesses the change in the market and the actions Google would have taken, had it not illegally used the Infringed Java Copyrights. While such “but-for” analyses have their place in assessing intellectual property damages, I do not believe that they are relevant to evaluating causation in connection with copyright infringement disgorgement of profits.
32. The relevant inquiry for copyright infringement disgorgement is the profits of the infringer attributable to the infringement, not cost savings or a speculative and unsupported counterfactual analysis that ignores important economic elements such as the dynamic and unpredictable nature of platform competition.<sup>20</sup>
33. My understanding from counsel is that the copyright disgorgement remedy is supposed to preclude the possibility that such a defendant benefits from the infringement. By permitting the infringer to

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<sup>16</sup> <http://www.morningstar.com/earnings/printranscript.aspx?id=18282869>.

<sup>17</sup> <http://allthingsd.com/20101214/d-dive-into-mobile-the-full-interview-video-of-google-androids-andy-rubin/>.

<sup>18</sup> Expert Report of Professor Adam Jaffe, February 29, 2016, ¶ 19.

<sup>19</sup> Expert Report of Dr. Leonard, February 8, 2016, p. 13.

<sup>20</sup> I understand from counsel that the reason for this is that copyright infringement typically results from intentional acts. Except in rare cases, infringers do not copy by accident—they know they are undertaking an act that involves reproducing the material of another. Unlike patents which might be infringed entirely by accident and without knowledge of any kind of an underlying right, copyright infringement generally occurs only when a defendant has knowingly copied something—even if that copying was not also a knowing infringement.



“reoptimize and choose new actions” the Court would be permitting Google to escape the consequences of its actions because of what it *might* have done, even though it did not in fact pursue that alternative approach. Such an approach improperly ends up allowing Google to retain profits that were in fact generated by the infringement in the real world.

34. Although Dr. Leonard “speaks as an economist” when explaining his counterfactual approach to copyright disgorgement causation, he cites to no case law, economic treatise or peer reviewed article to support his opinion that the application of this approach is appropriate.
35. I am not aware of any damages treatise or peer reviewed article that supports Dr. Leonard’s counterfactual approach to evaluating causation in connection with a copyright infringement disgorgement analysis. On that point, in connection with preparing this report, I reviewed each of the following texts in search of any such reference. I found none.
  - Litigation Services Handbook, The Role of the Financial Expert (Second Edition), Roman L. Weil, Michael J Wagner, Peter B. Frank (1995);
  - Litigation Services Handbook, The Role of the Financial Expert (Third Edition), Roman L. Weil, Michael J Wagner, Peter B. Frank (2001);
  - Economic Approaches to Intellectual Property, Dr. Gregory K. Leonard and Dr. Lauren J. Stiroch (2005);
  - Intellectual Property Valuation, Exploitation and Infringement Damages, Gordon v. Smith and Russell L. Parr (2005);
  - Economic Damages in Intellectual Property, Daniel Slottje (2006);
  - Litigation Services Handbook, The Role of the Financial Expert (Fifth Edition), Roman L. Weil, Daniel G. Lentz, David P. Hoffman (2012);
  - Assets and Finances: Calculating Intellectual Property Damages, Richard B. Troxel and William O. Kerr (2014);
36. In addition to reviewing the above texts, I have also reviewed the model jury instruction for the Ninth Circuit as it relates to the evaluation of causation in copyright matters and have found no reference to Dr. Leonard’s counterfactual approach.
37. Dr. Leonard also argues that I “agree” with him that a counterfactual world is a necessary consideration of the causal nexus in a disgorgement analysis because my Initial Report discusses commercially available noninfringing alternatives. This is incorrect. My Initial Report discusses the alternatives actually considered and rejected in the real world by Google, which strongly supports the notion that the Java APIs were a gating item to the Android Platform. This is not a discussion of a counterfactual world. It is a discussion of the real-world business limitations that were faced by Google at the time.
38. With this understanding in mind, I further address the flaws reflected in Dr. Leonard’s counterfactual analysis, as discussed in the paragraphs that follow.



39. The substantial amount of growth in the developer community, the increase in mobile data use, and the transformation of mobile handsets during Google's unique window of opportunity (none of which were considered by Dr. Leonard), make his attempt to construct a "but-for" (counterfactual) world highly speculative.<sup>21</sup>
40. Nowhere does Dr. Leonard explain how his non-existent "counterfactual" world would have arisen to exclude Java, despite the clear market circumstances at the time. As explained by Dr. Jaffe, it does not make sense to think that Apple would have achieved all of the market share because it was considered the high-end platform. There was room for another platform, as 80% of the market at that point was already using, and therefore familiar with, Java. Sun had already licensed Java SE for use in smartphones, and one of those phones was presented as the new device of the year at JavaOne in 2006.<sup>22</sup> Sun was also poised to offer additional SE-based smartphones in higher functioning devices either itself or through another licensee such as SavaJe. Dr. Leonard provides absolutely no support for how his counterfactual world would have developed without significant participation (and therefore earned revenues) by Java.
41. Dr. Leonard inappropriately uses an untested, unproven and unaccepted model to estimate the decrease in Android handset sales that would have occurred in a counterfactual world where there were fewer Android apps, as well as the percentage of the Android sales decrease that would have been captured by the iPhone. Dr. Leonard uses the model, which was developed for an entirely different purpose, to estimate the amount of ad revenue he asserts Google would have earned on those additional iPhone units and relies on that conclusion in connection with forming his opinions.<sup>23</sup> Dr. Leonard uses little, if any, evidence produced in this case to perform this analysis. Instead, he applies theoretical formulas to third party data which is disconnected from the evidence produced in this matter.
42. Dr. Leonard also inappropriately provides an alternate lost profits opinion in which iPhone is granted a larger portion of the "but-for" market based on a diversion ratio resulting from the counterfactual analysis. However, that analysis is flawed for the same reason. Dr. Leonard applies a model that was developed for a different purpose under a different set of assumptions about the smartphone market. I address each of the following points in response to Dr. Leonard's counterfactual approach and its application to his damages opinions:
  - Dr. Leonard's reliance on the Berry Model is improper
    - ✓ The Berry Model has limitations, according to Berry
    - ✓ Kim's application of the Berry Model makes it unreliable
  - Dr. Leonard's reliance on the Kim Model is also improper

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<sup>21</sup> Expert Report of Professor Adam Jaffe, February 29, 2016, ¶ 19-58.

<sup>22</sup> <http://news.softpedia.com/news/Jasper-S20-Java-Powered-Mobile-Phone-23841.shtml>.

<sup>23</sup> Expert Report of Dr. Leonard, February 8, 2016, p. 90.



- ✓ The smartphone share calculation is unreliable
- ✓ The app share calculation is unreliable
- ✓ Kim's "but for" model neglects consideration of market participants<sup>24</sup>
- ✓ The Kim Model ignores significant aspects of the counterfactual world

#### 4.3 Dr. Leonard Improperly Applies the Berry Model

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43. Dr. Leonard performs calculations based on a 1994 Berry article entitled "Estimating Discrete-Choice Models of Product Differentiation" which proposes "estimation by 'inverting' the market-share equation to find the implied mean levels of utility for each good".<sup>25</sup>

*This article considers the problem of estimating supply and demand models in markets with product differentiation. In common with some previous articles, market demand is derived from a general class of discrete choice models of consumer behavior. The utility of consumers depends on product characteristics and individual taste parameters; product-level market shares are then derived as the aggregate outcome of consumer decisions. Firms are modelled as price-setting oligopolists, and endogenous market outcomes are derived from an assumption of Nash equilibrium prices.<sup>26</sup>*

##### 4.3.1 The Berry Model Has Limitations, According to Berry

44. Even the 1994 Berry Inversion paper which Dr. Leonard relies on describes inherent limitations with the approach, rendering it inapplicable in this matter.<sup>27</sup> For example, "I should emphasize in closing that the techniques of this article rely on a number of restrictive assumptions. These include assumptions that demand is well approximated by a static discrete-choice model and that the distribution of consumer tastes is known up to a parameter vector. More importantly, and more difficult to solve, I assume that product characteristics are economically exogenous."<sup>28</sup> Additionally, the paper states: "Also, in practice, the number of product characteristics that are important to consumers may be much larger than the number of observations available to the econometrician, making it impossible to estimate the separate effects of each characteristic."<sup>29</sup>

##### 4.3.2 Dr. Leonard's Application of the Berry Model is Unreliable

45. Dr. Leonard's application of the Berry inversion is not a peer accepted model amongst damages experts. I understand "discrete choice models" model choices consumers make between a set of alternatives.<sup>30</sup> Google's ability to enter the mobile handset market and gain unexpected success

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<sup>24</sup> Although Blackberry is also considered in Dr. Leonard's calculations, this alone does not account for the unknown nature of what other players would have played a material role in the but-for market.

<sup>25</sup> "Estimating discrete-choice models of product differentiation," Steven T. Berry, 1994.

<sup>26</sup> "Estimating discrete-choice models of product differentiation," Steven T. Berry, 1994.

<sup>27</sup> "Estimating discrete-choice models of product differentiation," Steven T. Berry, 1994.

<sup>28</sup> "Estimating discrete-choice models of product differentiation," Steven T. Berry, 1994.

<sup>29</sup> "Estimating discrete-choice models of product differentiation," Steven T. Berry, 1994.

<sup>30</sup> "Estimating discrete-choice models of product differentiation," Steven T. Berry, 1994.



provides evidence of the unique opportunity window that existed at that time. Additionally, the model ignores the possibility of the introduction of a successful smartphone operating system by any other market participant.

46. I understand that utility in the economic sense represents the amount of satisfaction of consuming a good or service. Dr. Leonard ignores the fact that different types of consumers choose the iPhone, as compared to an Android device, as well as the fact that consumer preference may have differed in the market absent Android.
47. Even as to consumers, mobile handset demand is not based entirely on apps alone; there are other features that contribute to consumer demand for a mobile handset, as Dr. Leonard notes throughout his report. Also, not all users value apps the same, as the Kim Model states: “iPhone users receive higher utility from an app of same quality than Android users do, which may be because iPhone users are more likely to love apps in general than Android users”.<sup>31</sup>
48. For at least these reasons, Dr. Leonard’s use of the Berry Model is not an accepted method for the determination of damages or a “but-for” estimation of the non-infringing market and, as such, it should be rejected in its entirety. These flaws are only compounded by Dr. Leonard’s use of the Kim Model.

#### 4.4 Dr. Leonard’s Application of the Kim Model is Improper

49. Dr. Leonard relies on an empirical economic model of smartphone demand developed by Min Jung Kim, an economics doctoral candidate from the University of Minnesota, to arrive at the diversion ratio in conjunction with the Berry Model.<sup>32</sup> The “Kim Model” is a dissertation thesis written by a PhD candidate that, to my knowledge, was not published in any peer-reviewed journals and has not been accepted by the courts as an appropriate damages methodology. Dr. Leonard errs in relying on an empirical model that has not been peer-reviewed or accepted for a determination of damages.
50. The inputs used by Dr. Leonard in the Kim Model are also unreliable. Dr. Leonard describes the share calculations as follows:<sup>33</sup>
  - **Smartphone Share:** The share of a smartphone OS in a given month - defined as the U.S. unit handset sales in that month divided by the U.S. population over the age of ten.
  - **App Share:** An app’s market share - defined as the number of downloads of the app in a given month divided by the handset sales of the OS in that month.

<sup>31</sup> “Essays on the Economics of the Smartphone and Application Industry,” Min Jung Kim, 2013, p. 41.

<sup>32</sup> “Essays on the Economics of the Smartphone and Application Industry,” Min Jung Kim, 2013.

<sup>33</sup> Expert Report of Dr. Leonard, February 8, 2016, p. 92.



Dr. Leonard's report and exhibits do not show his calculations of these shares or how he relies on the results of these two calculations to ultimately arrive at his recapture percentages or diversion ratio. Despite exclusion of his calculations, I address the flaws in his descriptions of these inputs.

#### 4.4.1 The Smartphone Share Calculation is Unreliable

51. Dr. Leonard's calculation of smartphone share is based on U.S. handset sales and the entire U.S. population over ten. This basis assumes every person in the U.S. over the age of ten owns a mobile handset. While a growing portion of the population owns a mobile handset, this spreads each smartphone OS across too broad of a population and thus the results are likely to be inaccurate. As a point of reference, 35% of the adult U.S. population owned a smartphone in 2011 and 68% in 2015.<sup>34</sup>
52. These variables and inputs appear arbitrary, as the relevance of the number of people over the age of ten to total U.S. handset sales is unclear. There is no evidentiary support for assuming that all people over the age of ten in the U.S. have handsets or even represent a meaningful population relevant to this case. The Kim Model reveals a difference in handset use between different age groups stating: "richer and younger consumers prefer the iPhone over Android phones, and at the same time, they tend to like apps more".<sup>35</sup> Furthermore, focusing on only the U.S. handset market inappropriately portrays the worldwide market and ultimately applies a U.S. based analysis to worldwide revenues. In support of the differences between the U.S. and worldwide markets, the Kim Model states that the U.S. accounts for roughly 30% of global app downloads.<sup>36</sup>

#### 4.4.2 The App Share Calculation is Unreliable

53. Dr. Leonard improperly uses a calculation of the app share, or app utility to a smartphone user, as a variable in his counterfactual analysis. To determine which apps to use in this analysis, Dr. Leonard relied on the top paid and free app lists from AppAnnie data from January 2012 to December 2015.<sup>37</sup> According to Dr. Leonard's use of the model, any app in the following categories is assumed to be available on Android in the counterfactual, but apps in none of these categories are assumed to be unavailable in the counterfactual:
  - It is a Google App;
  - It was written using the NDK;
  - It was multi-homed on iOS;
  - Its developer also developed apps for iOS;

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<sup>34</sup> <http://www.pewinternet.org/2015/10/29/the-demographics-of-device-ownership/>.

<sup>35</sup> "Essays on the Economics of the Smartphone and Application Industry," Min Jung Kim, 2013, p. 27.

<sup>36</sup> "Essays on the Economics of the Smartphone and Application Industry," Min Jung Kim, 2013, p. 2.

<sup>37</sup> Expert Report of Dr. Leonard, February 8, 2016, p. 92.



- Its developer also developed NDK Android apps.<sup>38</sup>

54. Dr. Leonard's counterfactual analysis improperly only considers apps downloaded in the first month of owning a smartphone. The Kim Model acknowledges the limitations of this assumption: "apps that are already installed on the device upon purchase (factory-installed apps) may also create non-negligible economic value but they are not considered in the paper due to lack of data". Additionally, "one limitation of the study is that the possibility of different utilization of each app (e.g., depending on price and category) is ignored".<sup>39</sup>

55. Lastly, in his applications of the counterfactual results, Dr. Leonard inappropriately uses 2012 as a proxy for all prior years. I understand that prior to 2012 there were fewer apps available on the market.<sup>40</sup> Since the number of apps was rapidly changing over the relevant period, Dr. Leonard's assumption that the 2012 share would be the same in prior years is also flawed. Additionally, the Kim Model indicates limitations with this assumption: "consumers who purchase smartphones earlier in time or choose a smartphone with a better app system are already predisposed to purchasing apps."<sup>41</sup>

56. Despite these core flaws rendering the Kim Model unreliable for Dr. Leonard's purpose, Dr. Leonard uses these smartphone and app shares in a series of ill-described calculations that are based on a number of flawed or undisclosed assumptions to purportedly calculate the:

- The decrease in Android's sales; and
- The increase in iPhone sales in the counterfactual relative to their actual levels.<sup>42</sup>

He then takes the weighted averages to calculate (again in an unclear way) by year:

- The percentage Android sales decrease in the counterfactual; and
- The percentage of the Android sales decrease in the counterfactual that is captured by the iPhone (the "diversion ratio")<sup>43</sup>

#### 4.4.3 Use of the Kim and Berry Models to Determine a "But-For" World Neglects Consideration of Other Market Participants

57. As part of Dr. Leonard's determination of the number of additional iPhone units that would have been sold in the counterfactual, he assumes "Apple would have had time to expand its supply of iPhones and, indeed, the capacity in the various component industries made available by the lower

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<sup>38</sup> Expert Report of Dr. Leonard, February 8, 2016, pp. 92-93.

<sup>39</sup> "Essays on the Economics of the Smartphone and Application Industry," Min Jung Kim, 2013, p. 16.

<sup>40</sup> Exhibits 1b, 3d.2, 3d.3, 4e, and 4f to the Expert Report of Dr. Leonard, February 8, 2016.

<sup>41</sup> "Essays on the Economics of the Smartphone and Application Industry," Min Jung Kim, 2013, p. 27.

<sup>42</sup> Expert Report of Dr. Leonard, February 8, 2016, pp. 93.

<sup>43</sup> Expert Report of Dr. Leonard, February 8, 2016, p. 93.



Android handset sales could have been utilized by Apple.”<sup>44</sup> This is untrue as Apple has experienced numerous supply shortages when releasing its iPhone products.<sup>45</sup> In fact, it has suffered from supply shortages almost every time it has released an iPhone. Yet, Dr. Leonard’s analysis simply assumes away that real world fact.

58. This assumption also ignores other players in the market with access to those same resources. While Android sales may have dropped, Dr. Leonard’s model ignores that another entity with their own OS may have required the same resources in a “but for” Android world. Additionally, it suggests Apple’s closed environment would have monopolized the smartphone market which ignores the success that resulted from Android’s free open source model. Android was able to compete with Apple and, “but-for” Android, other parties could have competed as well.<sup>46</sup> There were already numerous other participants in the market, including Microsoft and Nokia with their own platforms, and numerous players selling Java-based devices. Indeed, without more detailed information related to Apple’s supply chain, it is unreasonable even to assume that Apple would have had the capacity to make all of the additional Android related sales.
59. Absent Android, which secured a number of critical relationships to gain its success, parties would have formed different relationships and continued to compete in the mobile handset market.

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

<sup>47</sup>  
<sup>48</sup>

<sup>49</sup> [REDACTED] to expect OEMs to do

nothing to successfully compete with iPhone in the counterfactual world is inappropriate. Android’s success ceased much of the activity by competitors and became a barrier to entry. Guessing what would have occurred without its rapidly successful presence in the market requires too many assumptions for a reasonable damages opinion.<sup>50</sup>

60. Assuming Android would have existed without Google’s infringement is also speculative. It would have taken Google longer to get to market had it not used the Infringed Java Copyrights.<sup>51</sup> Given the unique window of opportunity in the mobile space at the time, a delay would have altered the market dynamics.

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<sup>44</sup> Footnote 286 to the Expert Report of Dr. Leonard, February 8, 2016, p. 93.

<sup>45</sup> <http://www.pc当地2/0,2817,2366762,00.asp>, <http://www.cnet.com/news/iphone-6s-plus-in-short-supply-due-to-production-issues-says-analyst/#!>; <http://www.zdnet.com/article/iphone-5s-reportedly-in-short-supply-for-fridays-launch/>.

<sup>46</sup> Expert Report of Professor Adam Jaffe, February 29, 2016, ¶¶20-41.

<sup>47</sup> OAGOOGLE0002778854-882 at 855 and 869.

<sup>48</sup> OAGOOGLE0000799926; <http://www.pc当地2/0,2817,2366762,00.asp>.

<sup>49</sup> OAGOOGLE0000799926; OAGOOGLE0000457616-617 at 617.

<sup>50</sup> I note that these issues are further discussed in the section of my report which responds to Dr. Leonard’s comments concerning my lost profit opinions.

<sup>51</sup> Expert Report of Professor Adam Jaffe, February 8, 2016, ¶¶196 and 199.



#### 4.4.4 The Kim Model Ignores Significant Aspects of the Counterfactual World

61. Without the market power from the success of Android, Google likely would have been in a much different bargaining position. While it is difficult to reconstruct a smartphone market absent Android, a few observations can be made as to the likely “but-for” world. First, it is likely that an alternative player in the market would have competed with iPhone.<sup>52</sup> It is also likely that Google’s profitability would have suffered absent the market power resulting from Android’s success, because Google would have faced greater competition for access to mobile apps, advertising, and browser traffic. Absent Android, Google would likely have been much less relevant to the mobile handset industry since it would not directly participate. The concern of exactly this circumstance developing is what drove Google to copy the Java APIs without permission rather than develop its own. Thus, implying Google would have earned additional revenue on improperly determined additional iPhone units does not consider how Google’s weakened bargaining position would have impacted its relationship with Apple.
62. Based on the above, Dr. Leonard’s counterfactual model is unreliable for use in a damage calculation. It admittedly does not take into account a myriad of alternatives and factors that clearly would have impacted the smartphone market “but for” Android’s use of the Infringed Java Copyrights. These limitations of Dr. Leonard’s counterfactual model render the results irrelevant to the determination of damages in this case.

#### 4.5 Dr. Leonard’s Analyses of the Profit Google Realized from Android Are Defective

63. Dr. Leonard’s quantification of the profits Google realized through the development and commercialization of the Android operating system (as reflected in Leonard Exhibits 1a.1 and 1a.4) are both defective and unreliable for at least the reasons set forth below.

##### 4.5.1 Dr. Leonard Substantially Understates “Android-Related Profits” (Leonard Ex. 1a.1)

64. Dr. Leonard’s “top-down” “Android-Related Profits” analysis begins in Leonard Exhibit 1a.1 and continues to Leonard Exhibit 3e. It results in “Android-Related Profit” of [REDACTED] and “Android-Related Profit (Apportioned to the 37 APIs)” of \$56.3 million. Dr. Leonard’s calculation of “Android Related Profits” is similar to the summary of Google’s reported Android operating results in Revised Exhibit 7 attached hereto. In fact, only the following three cost/expense line items are different: 1) Traffic Acquisition Costs (a cost of sale), 2) “Android General and Administrative Expense” (an operating expense), and 3) “Incremental Search and Advertising Expense” (an operating expense). Each of these line items is discussed below:

##### 4.5.2 Dr. Leonard Effectively Double-Counts Search Traffic Acquisition Costs (TAC)

65. In Leonard Exhibit 1a.1, Dr. Leonard quantified Android-related TAC of [REDACTED] for the eight-year period 2008 to 2015. This amount is substantially overstated. As reflected in Revised Exhibit

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<sup>52</sup> Expert Report of Professor Adam Jaffe, February 29, 2016, ¶ 16.



7 attached hereto, my calculation of Android TAC for the same eight-year time period totals [REDACTED]

66. Dr. Leonard calculates 2011 to 2015 Android TAC in Leonard Exhibit 1d. In that Exhibit, Dr. Leonard utilizes total annual AdWords, AdSense and Display Revenue and TAC for “Google as a whole”<sup>53</sup> to estimate Android-related TAC. Annual AdWords (i.e., Search) TAC in Leonard Exhibit 1d<sup>54</sup> compares closely to the annual TAC payments to “Non-Android Mobile Operating System Partners,”<sup>55</sup> as reported in the Google record at Docket No. 1436 of this matter. Annual AdWords TAC in Leonard Exhibit 1d also compares closely to the annual “TAC Paid to Distribution Partners,” figure Google reported in its Forms 10-K.<sup>56</sup> The Figure below provides a summary of Google’s reported: 1) TAC for AdWords; <sup>57</sup> 2) TAC paid to “Non-Android Mobile O.S. Partners,”<sup>58</sup> and 3) TAC “Paid to Distribution Partners,”<sup>59</sup> for the years 2011 to 2014.

**Figure 3<sup>60</sup>**

**Comparative Analysis: AdWords TAC v. TAC Paid to Distribution Partners**

Source of Data	2011	2012	2013	2014
Google Total AdWords TAC	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
TAC Paid to "Non-Android Mobile O.S. Partners"	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
Google Total "TAC Paid to Distribution Partners"	\$1,517.0	\$2,165.0	\$2,965.0	\$3,633.0

67. As the above Figure illustrates, the annual AdWords TAC figure utilized by Dr. Leonard represents nearly [REDACTED] of the total annual TAC paid to “Non-Android Mobile O.S. Partners,” as reported to this Court in Docket No. 1436, and nearly [REDACTED] of the total annual “TAC Paid to Distribution Partners,” as Google reported in its Forms 10-K. Based on my review of the record evidence, I conclude that the annual AdWords TAC figures are captured in and are a part of “Non-Android Mobile O.S. Partners” and “TAC Paid to Distribution Partners.” Stated differently, all three of these cost descriptions capture the same AdWords-related TAC paid to Non-Android

<sup>53</sup> See Email from Daniel Purcell to Annette Hurst, November 8, 2015.

<sup>54</sup> GOOG-00022380; for “Google as a whole.” See Email from Daniel Purcell to Annette Hurst, November 8, 2015.

<sup>55</sup> See Exhibit 14; Case No. CV 10-03561 WHA, Docket No. 1436; “Google Search Distribution Agreements with Non-Android Mobile Operating System Partners.”

<sup>56</sup> Google 2013 Form 10-K, p. 31; Google 2014 Form 10-K, p. 26.

<sup>57</sup> GOOG-00022380; for “Google as a whole.” See Email from Daniel Purcell to Annette Hurst, November 8, 2015.

<sup>58</sup> See Exhibit 14; Case No. CV 10-03561 WHA, Docket No. 1436; “Google Search Distribution Agreements with Non-Android Mobile Operating System Partners.”

<sup>59</sup> Google 2013 Form 10-K, p. 31; Google 2014 Form 10-K, p. 26.

<sup>60</sup> See Exhibit 14.



Distribution Partners. That is: all three costs descriptions represent the same dollars paid to Non-Android Distribution Partners.

68. As indicated in my Initial Report, the Android-related Distribution Partners to which Google pays TAC are primarily wireless carriers. Google developed and commercialized the Android operating system to, among other things, avoid paying TAC to other mobile platforms to direct Internet traffic to Google websites. As discussed in my Initial Report, the Android-related TAC Google pays to wireless carriers is captured and accounted for in Android Profit and Loss Statements as Apps and Digital Content Cost of Sales.<sup>61</sup>
69. According to Dr. Leonard, “Apps COS includes payments for developers, credit card fees and payments to carriers,”<sup>62</sup> and “Digital Content COS . . . include payments to carriers, credit card companies and content owners, such as publishers.”<sup>63</sup> A May 2015 Google presentation entitled “Introduction to Android” indicates that Google expected to pay approximately [REDACTED] of TAC in 2015 to its Android carrier Distribution Partners, OEMs, and Retail Partners through revenue-sharing agreements, channel incentives, and rent.<sup>64</sup> To the extent Google actually incurred these costs, they are captured in Revised Exhibit 7 as App Cost of Sales, Digital Content Cost of Sales, and likely Sales Expense and Marketing Expense.<sup>65</sup>
70. According to Mr. Jonathan Gold:

*Q. What are the carriers being paid for?*

*A. The bulk of this is Google Play rev share for the payment processing, and then there's a portion of it that is related to traffic acquisition costs for Google.com when carriers choose to set Google as the default search.*

*Q. And what are the OEMs being paid for?*

*A. Similar things. . . But largely that is for Google.com rev share.*

*Q. And what are the retailers being paid for?*

*A. This is almost entirely rent in the cases of selling things from Chromecast to trying to encourage third-party devices to be sold.<sup>66</sup>*

71. Because the TAC that Google pays its Android Distribution Partners is accounted for in the Android Profit and Loss Statements summarized in Revised Exhibit 7, primarily as Apps and Digital Content Cost of Sales, Dr. Leonard’s inclusion of AdWords TAC (alternatively described as “TAC Paid to “Non-Android Mobile O.S. Partners”) in his calculation of Android-related TAC

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<sup>61</sup> My Initial Report, pp. 119-120.

<sup>62</sup> Expert Report of Dr. Leonard, February 8, 2016, p. 22.

<sup>63</sup> Expert Report of Dr. Leonard, February 8, 2016, p. 22.

<sup>64</sup> GOOG-00130338-386 at 340.

<sup>65</sup> Revised Exhibit 7.

<sup>66</sup> Deposition of Jonathan Gold, December 11, 2015, p. 185-186.



substantially overstates Android-related TAC. Thus, Dr. Leonard's calculation of Android-Related Profits in Leonard Exhibit 1a.1 is defective and unreliable.

72. My Android-Network-Member-related TAC calculation in Revised Exhibit 7.1 properly quantifies only the Google-Network-Member portion of annual TAC related to AdSense and Display that is not already accounted for in the Android Profit and Loss Statements reported by Google. Thus, my quantification of Android-related TAC accurately estimates the annual amounts of TAC incurred by Google.

**4.5.3 General & Administration Allocation is Improper and Contrary to the Record Evidence**

73. Dr. Leonard improperly deducts "Android General and Administrative" expenses of [REDACTED] in his "Android-Related Profits" calculation reflected in Leonard Exhibit 1a.1.<sup>67</sup> This deduction results in an understatement of "Android-Related Profits."

74. As indicated in my Initial Report,<sup>68</sup> during the relevant time period, Google regularly reported the profits it earned from the Android Platform to its Android Operating Committee, as well as to other Google executives. As set forth in my Initial Report, Google's contemporaneous business and financial records consistently identify the same cost of sales and operating expense line items as deductions from Android-related revenues in reporting Android-related profit.<sup>69</sup>

75. The Profit and Loss Statements contained within these contemporaneously-prepared business records, in addition to other data, provide a basis for quantifying the costs and expenses that actually helped generate the revenues I have determined are causally connected to the Infringed Java Copyrights.<sup>70</sup> Revised Exhibit 7 is a summary of Android-related annual operating results as reflected in many of these contemporaneous business records.

76. Google retained Dr. Alan Cox in connection with the 2012 trial for this matter. On October 3, 2011, Dr. Cox issued the Expert Report of Dr. Alan J. Cox ("the Cox Report") which included a summary of "Profit and Loss Statements of the Android Platform" for the period January 2008 to September 2011 at Cox Exhibit 3b. The Figure below is an image of Cox Exhibit 3b which reflects all of the revenues (including, notably, "Android Gross Ad Revenues"), cost of sales, and operating expenses that Dr. Cox attributed to the Android platform as of September 2011. As the

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<sup>67</sup> Expert Report of Dr. Leonard, February 8, 2016, Exhibit 1a.1.

<sup>68</sup> My Initial Report, Paragraph 295.

<sup>69</sup> See, for example: GOOGLE-00303725 – 756 at 739; GOOGLE-01-00053552 – 591 at 556; GOOGLE-77-00053555 – 575 at 562; GOOG-00103813; GOOG-00100278 – 301 at 301; GOOG-00100391 – 408 at 401; GOOG-00104442 – 480 at 446; GOOG-00130338 – 386 at 342; GOOG-00131217 – 253 at 226; GOOG-00131428 – 461 at 452 and 456; GOOG-00132245 – 266 at 265; GOOG-00132508 – 534 at 518 and 532; GOOG-00132955 – 984 at 979; GOOG-00133825 – 856 at 851; GOOG-00186863 – 873 at 865; GOOG-00272276 – 298 at 286; GOOG-00272299 – 321 at 308; GOOG-00277550 – 585 at 559.

<sup>70</sup> Order Re Willfulness and Bifurcation, *Oracle America Inc. v. Google Inc.*, No. C 10-03561, September 18, 2015, p. 6-8.



following Figure illustrates, Dr. Cox did not allocate General and Administrative expenses to the Android platform.

**Figure 4**  
**Exhibit 3b to the October 3, 2011 Expert Report of Alan Cox**

Line Item	2008	2009	2010	2011
	(1)	(2)	(3)	(4)
<b>Revenue<sup>1</sup></b>				
Android Gross Ad Revenues	\$ 0.68	\$ 15.71	\$ 140.43	\$ 387.51
Nexus Phone (DTC) Revenues	-	-	115.18	-
Android Market Revenues	0.02	1.10	8.03	22.13
<b>Total</b>	<b>\$ 0.7</b>	<b>\$ 16.8</b>	<b>\$ 263.6</b>	<b>\$ 409.6</b>
<b>Cost of Sales<sup>1</sup></b>				
TAC <sup>2</sup>	\$ 0.2	\$ 2.9	\$ 53.5	\$ 124.0
Operations	0.2	0.5	4.3	15.6
COS (incl. DTC)	0.0	0.3	109.9	9.9
<b>Total</b>	<b>\$ 0.4</b>	<b>\$ 3.7</b>	<b>\$ 167.7</b>	<b>\$ 149.5</b>
<b>Operating Expenses<sup>1</sup></b>				
Sales Expenses	\$ 0.9	\$ 3.2	\$ 5.2	\$ 6.6
Marketing <sup>3</sup>	12.3	16.6	53.3	44.3
Product Management ("PM")	0.0	1.9	8.0	1.1
<b>Total</b>	<b>\$ 13.20</b>	<b>\$ 21.71</b>	<b>\$ 66.45</b>	<b>\$ 51.92</b>
<b>Engineering Expenses<sup>1</sup></b>				
Engineering Expenses <sup>1</sup>	\$ 86.3	\$ 41.2	\$ 99.7	\$ 129.5
Amortized Cost of Engineering Expenses <sup>4</sup>	11.9	29.5	48.9	80.5
<b>Legal Expenses</b>	<b>\$ 1.0</b>	<b>\$ 2.1</b>	<b>\$ 32.2</b>	<b>\$ 75.8</b>

77. The General and Administrative expenses which Dr. Leonard allocates to the Android platform concern Google's finance and accounting, human resources, and real estate functions.<sup>71</sup> Dr. Leonard allocates these expenses based on the number of Android engineers as a percentage of the total number of Google engineers.<sup>72</sup> Dr. Leonard offers no economic, statistical, or other quantitative or qualitative analysis in support of the use of this metric as an allocation basis. To the contrary, Dr. Leonard cites primarily to "Conversations with Jonathan Gold" in support of his conclusions regarding the nature of and rationale for allocating these expenses. Without supporting quantitative or qualitative analysis, Dr. Leonard's allocation methodology is unreliable.

78. I understand that the Court has indicated that overhead expenses should be deducted "only when the infringer can demonstrate it was of actual assistance in the production, distribution or sale of the infringing product."<sup>73</sup> Dr. Leonard has not demonstrated that these General and Administrative expenses actually assisted in any of these corporate functions.

<sup>71</sup> Expert Report of Dr. Leonard, February 8, 2016, p. 25.

<sup>72</sup> Expert Report of Dr. Leonard, February 8, 2016, Exhibit 1e.

<sup>73</sup> Order Re Willfulness and Bifurcation, 3:10-cv-03561, Docket No. 1321, September 18, 2015, p. 10.



79. Given, among other things, the opinion of Google's previous expert, the nature of the allocated General and Administrative expenses, the Court's prior orders, and the contemporaneously-reported operating results for the Android platform which do not reflect [REDACTED] of General and Administrative expenses,<sup>74</sup> Dr. Leonard's allocation of these expenses to the Android platform is improper, and results in the understatement of his "Android-Related Profits."

#### 4.5.4 "Incremental" Search and Advertising Expenses Do Not Relate to Android

80. Dr. Leonard improperly deducts "Incremental Search and Advertising" expenses totaling [REDACTED] in his calculation of "Android-Related Profits" as reflected in Leonard Exhibit 1a.1.<sup>75</sup> The deduction of these "Incremental Expenses" from Android revenues results in the understatement of Dr. Leonard's "Android-Related Profits."

81. Like the "Android General and Administrative" expenses discussed above, these "Incremental Search and Advertising Expenses" are not reflected in the contemporaneously prepared Profit and Loss Statements, as summarized in Revised Exhibit 7.

82. Like the "Android General and Administrative" expenses discussed above, the "Incremental Search and Advertising Expense" is also not reflected in Cox Exhibit 3b, as reflected in the above Figure. And, as discussed previously, I believe Dr. Leonard's inclusion of these costs is an improper attempt to offset the significant amount of Android related profit Google has generated since 2011, when Dr. Cox issued his initial report.

83. Furthermore, Dr. Leonard's own analyses undermine his conclusion that these "Search and Advertising Expenses" were incurred in connection with the Android platform. For example, in Exhibit 1b – iPhone Recapture Adjustment – Dr. Leonard subtracts these same "Incremental Search and Advertising Expenses" of [REDACTED] to derive an "iPhone Recapture Adjustment" of [REDACTED]. In doing so, Dr. Leonard implies that these expenses would have been incurred by Google regardless of whether the Android platform was developed and commercialized.

84. Likewise, in Leonard Exhibit 1a.4, Dr. Leonard excludes these expenses in his calculation of "Profit Apportioned to Android Versus Search/Ads Technologies and Services." In doing so, Dr. Leonard again implicitly concedes that none of these "incremental" expenses are actually attributed to Android, and that these expenses, in fact, relate only to Google's "Search/Ads Technologies and Services." If Dr. Leonard's ultimate opinion was that any portion of these "Incremental Search and Advertising Expenses" were actually incurred in connection with the Android platform, then some portion of these expenses would be reflected in this calculation.

85. Given, among other things, the opinions of Google's other experts, Dr. Leonard's own analyses, and the contemporaneously-reported operating results for the Android platform which do not

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<sup>74</sup> As summarized on Exhibit 7 to my Initial Report.

<sup>75</sup> Expert Report of Dr. Leonard, February 8, 2016, Exhibit 1a.1.



reflect [REDACTED] of ‘Incremental Search and Advertising Expenses,’<sup>76</sup> Dr. Leonard’s inclusion of these expenses in his calculation of “Android-Related Profits” is improper and results in an understatement of Google’s “Android-Related Profits.”

#### 4.5.5 Dr. Leonard’s “iPhone Recapture Adjustment” is Defective

86. According to Dr. Leonard, “I determined that Google would recapture at least 44% of its ad revenue on Android handsets with ad revenue on iPhones.”<sup>77</sup> In connection with offering that opinion, in Leonard Exhibit 1b, Dr. Leonard calculates that Google would have recaptured [REDACTED] [REDACTED] of profit from Ad Revenue “in the absence of Android.”<sup>78</sup> Dr. Leonard’s “iPhone Recapture Adjustment” is defective for several reasons, including at least the following.

##### 4.5.5.1 Dr. Leonard Failed to Sufficiently Account for Differences in Price

87. According to Dr. Leonard, “[a]s a result of OEM’s product development efforts and the competition between OEMs promoted by Android, the prices of Android devices have decreased substantially over time, while their quality has improved dramatically. For example, between 2010 and 2015, the quality-adjusted contract price for an Android handset decreased from \$213 to \$14 . . .”<sup>79</sup> Leonard Exhibit 2a indicates that the per-unit Android contract price declined from \$213 as of Q1 2010, to \$88 as of Q4 2015.<sup>80</sup>

88. Unlike Android prices, the prices of iPhones have remained relatively high. The Figure below illustrates annual iPhone prices, annual Android prices, and the pricing difference for the five-year period 2010 to 2014. As the Figure illustrates, iPhone prices ranged from a low of \$650 to a high of \$710, while Android smartphone prices declined from \$441 to \$254 during this time period.<sup>81</sup>

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<sup>76</sup> As summarized on Exhibit 7 to my Initial Report.

<sup>77</sup> Expert Report of Dr. Leonard, February 8, 2016, p. 27.

<sup>78</sup> Expert Report of Dr. Leonard, February 8, 2016, p. 27 and Exhibit 1b.

<sup>79</sup> Expert Report of Dr. Leonard, February 8, 2016, p. 44.

<sup>80</sup> Expert Report of Dr. Leonard, February 8, 2016, Exhibit 2a.

<sup>81</sup> The Price Gap Between iOS and Android is Widening, Statista, Felix Richter, June 1, 2014; <https://www.statista.com/chart/1903/average-selling-price-of-android-and-ios-smartphones/>